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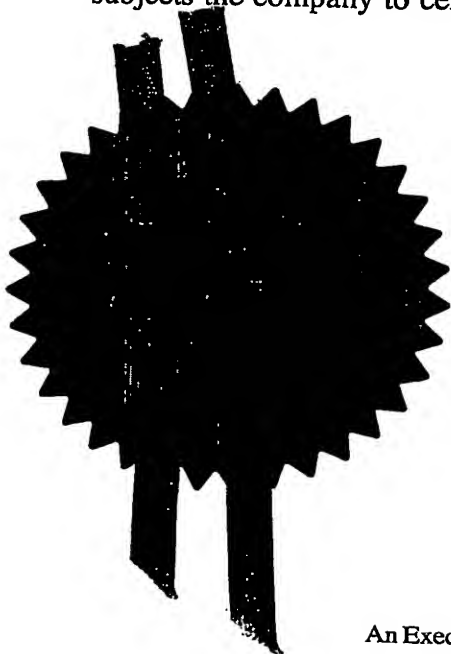
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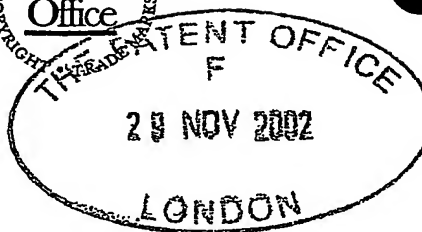


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1/77

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29 NOV 2002

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6.70.1036 UK

2. Patent application number

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0227930.5

02DEC02 E767560-6 D00073  
P01/7760 0.06-0227930.5

3. Full name, address and postcode of the or of each applicant (underline all surnames)

INTERBREW S.A.  
VARSTRAAT 94  
B-3000 LEUVEN  
BELGIUM

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

A BELGIAN CORPORATION

4. Title of the invention

BEER DISPENSING SYSTEM WITH GAS  
PRESSURE RESERVOIR

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

G.F. REDFERN & CO.  
LYNN HOUSE  
IVY ARCH ROAD  
WORTHING  
WEST SUSSEX. BN14 8BX

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1412002

84 3535 6001

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number  
(if you know it)

Date of filing  
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

YES

- a) any applicant named in part 3 is not an inventor, or
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Description

10

Claim(s)

3

Abstract

1

Drawing(s)

4 + 4

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11.

I/We request the grant of a patent on the basis of this application

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Mrs. S.M. Camp  
01903 820466

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- 1 -

## BEER DISPENSING SYSTEM WITH GAS PRESSURE RESERVOIR

### Field of the Invention

The present invention relates to an alcohol beverage dispensing beverage apparatus having a pressure system for use in dispensing an alcohol beverage and in particular, relates to a home beer dispensing apparatus having a gas pressure reservoir.

### Background of the Invention

Beer dispensing apparatus are known in the art for dispensing of draft beer in taverns and the like. Typically, the beer is dispensed from a keg under pressure from CO<sub>2</sub> tanks forming part of the pressure system. Such draft beer dispensers are utilized in taverns where the large volumes of beer are dispensed everyday and the taverns have refrigerated rooms to store the kegs.

This is not the case for a domestic or home beer dispensing apparatus that is adapted to sit on a countertop in a kitchen where space is at a premium. Further, the domestic beer dispensing system typically stores the beer in a bag contained in a keg and pressure is applied between the keg inner walls and the bag to assist in the dispensing of beer

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from the keg.

Due to limited countertop space requirements, there is a requirement in the home beer dispensing apparatus to reduce compressor size and still maintain sufficient pressure within the keg to properly effect the dispensing of beer from the keg. Further there is a need to provide sufficient pressure to reduce dampening pressure fluctuations during dispensing which can result in beer frothing, especially during the early stages of dispensing beverage where the head pressure in the keg is minimal.

#### Summary of the Invention

It is an object of the present invention to provide an alcohol beverage dispenser wherein sufficient pressure is maintained to reduce dampening pressure fluctuations during alcohol dispensing, especially during the early stages of alcohol dispensing.

It is a further object of the present invention to provide an alcohol beverage dispensing apparatus which reduces compressor rating.

The present invention relates to an alcohol beverage dispensing apparatus comprising a keg having a self-contained bag filled with an alcohol beverage. Preferably, the beverage is beer. The dispensing apparatus has a pressure system adapted to maintain a gas pressure in the keg against the bag to assist in the dispensing of the beverage from the dispensing apparatus. The pressure system has a pressure reservoir that stores a charge of pressurized gas which is preferably air. The reservoir is mounted in the apparatus outside the keg and in fluid flow communication with the interior of the keg. The reservoir is adapted to transmit at least a portion of its charge of pressurized gas into the keg when the dispensing apparatus is operated to dispense the beverage.

By providing a reserved charge of pressurized gas, a sufficient supply of gas is on hand to reduce dampening pressure fluctuations during alcohol dispensing which can result in beer frothing, especially during the early stages of alcohol dispensing when the air head space in the keg is small.

Preferably, the pressure system has a gas compressor connected with the pressure reservoir for charging the pressure reservoir with pressurized gas prior to the dispensing apparatus being operated to dispense the beverage. Additionally, the compressor may continue to be operated to charge the reservoir during dispensing of the beverage from the dispensing apparatus and, if necessary, after the dispensing cycle is completed. The compressor continues to change the pressure in the reservoir until it reaches a predetermined pressure level. As a result, the compressor rating is reduced.

In the preferred embodiment, to economize on space requirements in the dispensing apparatus, where the keg has a curved side wall, the pressurized reservoir has a curved wall adapted to surround in adjacent relation at least a portion of a curved side wall of the keg.

Preferably, the pressure system comprises a pressure switch connected in fluid communication between the pressure reservoir and a gas valve in the keg. The pressure switch enables pressurized gas to flow from the reservoir into the keg through the keg gas valve when beverage is dispensed from the bag. It is envisaged that this switch may form part of the keg gas valve, may be part of an exit or exhaust valve for the reservoir, or may be in a tube or tap interconnecting the reservoir with the keg gas valve.

~~In accordance with an aspect of the present invention there is~~

provided an alcohol beverage dispensing apparatus comprising a keg having a self-contained bag filled with an alcohol beverage. The dispensing apparatus comprises a pressure system adapted to maintain a gas pressure in the keg against the bag to assist in the dispensing of the beverage from the dispensing apparatus. The pressure system comprises a keg gas valve mounted to the keg to permit entry of pressurized gas into the keg and a pressure reservoir mounted in the apparatus outside the keg. The reservoir is in fluid flow communication with the keg gas valve. The pressure reservoir stores a charge of pressurized gas and is adapted to supply at least a portion of the charge of pressurized gas into the keg through the keg gas valve when the dispensing apparatus is operated to dispense the beverage.

#### Brief Description of The Drawings

For a better understanding of the nature and objects of the present invention reference may be had to the accompanying diagrammatic drawings in which:

Figure 1 is a front elevation view of a home beer dispensing apparatus in accordance with the present invention;

Figure 2 is a side elevation view of the home beer dispensing apparatus;

Figure 3 is a side sectional view of the keg shown inside the beer dispensing apparatus of Figure 2 illustrating the pressurizing system of the present invention;

Figure 4 is a perspective view of the interior of the home beer dispensing apparatus;

Figure 5 is an exploded view of the component parts of the

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compressor and pressure reservoir utilized in the pressure system of the present invention; and,

Figure 6 is a side sectional view of the compressor.

#### Detailed Description Of The Invention

Referring to Figures 1 and 2 there is shown a home beer dispensing apparatus, appliance or unit 10. The dispensing apparatus 10 is primarily intended for use in domestic kitchens but may also be used in utility rooms, garages, domestic bars, caravans etc. While the preferred embodiment relates to dispensing beer, alternatively carbonated solutions or other alcohol beverages may be dispensed by apparatus 10.

The home beer dispensing apparatus 10 has a front wall 12 and a dispensing tap 14 protruding forward of the front wall 12. A drip tray 16 also protrudes forward of the front wall 12 and is adapted to support an open glass container 18 below the dispensing tap 14. The home beer dispensing apparatus 10 further has a base 21 adapted to rest on a counter top in a kitchen. The front wall 12 is formed as an extension of two pivoting side walls 20 which may be moved between closed and open positions to allow the keg 22 (see Figure 2 in broken lines) to be inserted into the housing of the home beer dispensing apparatus 10. The housing of the home beer dispensing apparatus 10 further includes a top wall 24 and a rear wall 26. The rear wall 26 has a grill 30 that permits for air circulation within the home beer dispensing apparatus 10. An electrical cord 32 extends through the rear wall 26 of the apparatus 10 to provide a connection into a main electrical supply to supply electrical power to the electrical components housed within the dispensing apparatus 10. Alternatively, a 12 Volt DC supply input may be used.

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The dispensing apparatus 10 has a cooling system 23 located behind and below keg 22 that is adapted to cool the keg 22 of beer when placed in dispensing apparatus 10. The dispensing apparatus 10 also dispenses the beer by providing a pressurized air supply 50.

Referring to Figures 2, 3 and 4, cooling of the keg 22 within the beer dispensing apparatus 10 is accomplished by a cooling system 23 comprising cooling plate 70 in mechanical and heat transfer contacting relation with a bottom portion 44 of the keg 22 for extracting heat from the beer 52.

The cooling apparatus further includes a Peltier thermoelectric device 80 mounted in mechanical and thermal heat transfer contacting relation with the cooling plate 70. The Peltier thermoelectric device 80 is connected through a suitable leads and transformer 81 to the power supply line or cord 32 so that a voltage is applied across the Peltier thermoelectric device 80. The voltage drop across this Peltier cooling device 80 results in a thermal difference being generated across the device whereby surface 82 of Peltier device 80 is cooler than hot surface 84. As a consequence, heat is extracted from the cooling plate 70 which in turn extracts heat from the keg 22. The Peltier thermoelectric device 80 provides a low rate of continuous cooling. Active heat extraction is provided by heat sink 33 and cooling fan 35.

Referring to Figure 3, the keg 22 of the present invention is shown in more detail. The keg 22 has a general cylindrical shape with side walls 40 and a top wall or top portion 42 and a bottom wall or bottom portion 44. Both top wall 42 and bottom wall 44 are curved upwardly from the central portion of the keg 22 and are provided with a raised annular collar 46. The collars 46 provide additional support for the keg 22. Mounted

within the keg walls 40, 42 and 44 is a plastic bag 55 for containing alcohol beverage which in the preferred embodiment is beer 52.

As shown in Figure 3, the bag 55 almost completely fills the keg 22 and an air head space 62 is present. This illustration represents a condition where some of the beer 52 has already been dispensed from bag 55 and the bag 60 is partially deflated and beer 52 is under pressure. Arrows 63 represent air pressure within keg 22 acting against bag 55 to facilitate dispensing of beer 52.

It should be understood that initially the bag 55 lines the interior walls of keg 22 and is completely filled with beer 52 providing little or no head space 62. As the beer 52 is dispensed from the keg 22, an air pressure 63 is established between the walls of the bag 50 and the inside surfaces of walls 40, 42 and 44 of the keg. This head space 62 continues to grow as beer is dispensed until the beer is dispensed from bag 50.

The top portion 42 and collar 46 located in the top portion 42 of keg 22 has a keg beer dispensing valve 60 extending through the top collar 46. The valve 60 is connected to the tap 14 of the beer dispensing apparatus 10 by a tube or tap connection (not shown) extending from the keg dispensing device 60. The dispensing device 60 has a dip tube 66 that extends into the keg 22 within bag 55 so as to provide a remote opened end 64 adjacent the bottom portion 44 of the keg for drawing beer 52 from the keg adjacent the bottom portion 44 of the keg 22 as represented by arrows 45. Beer 52 is drawn through opening 64, up hollow tube 66, and out through valve 60 to the tap 14 (Figure 1).

Referring to Figures 3 and 4, the air pressure as indicated by arrows 63 within the keg 22 is provided by the air pressure system 50.

The air pressure system 50 is shown to comprise a compressor or pump

motor 90, a pressure reservoir 92, tubing or conduit 94, a pressure switch 96, and a one-way reed air valve 98.

The air valve 98 is a one way air valve comprising a reed type valve which permits air to flow into the space 62 between the bag 55 and the interior walls of the keg 22. This valve 98 is mounted to the keg and forms part of an over all valve system including the beverage dispensing valve 60. The air valve 98 is located within the collar 46 of the keg in a standardized location. The valve combination 60 and 98 is mounted into the keg through the collar 46 by knocking out a face plate that otherwise extends across the collar 46. The valves 60 and 98 are mounted in sealed relation with the keg 22. The valve 98 is in fluid communication with the reservoir 92 by means of tubing 94 and pressure switch 96. Tubing 94 may form part of the tap connection (not shown) which provides a standardized fitting on valves 60 and 98. Pressure switch 96 may form part of the valve 98 or alternatively may form part of the exhaust valve or opening for the reservoir 92. Pressure switch 96 is preferably activated by the activation of the dispensing tap 14 to draw beer 52 out through dispensing tube 66 and valve 60. This is indicated graphically in Figure 3 by the broken line extending from switch 96 with an arrow pointing towards number 14 representative of tap 14.

The reservoir 92 is located with its wall 100 located in abutting relation with an outside wall 40 of the keg 22. As shown better in Figure 4, the wall 100 of the air reservoir 92 is curved to follow and be adjacent to the curvature of the cylindrical wall 40 of the keg 22. The placement of the reservoir 92 above the Peltier cooler 80 adjacent the keg 22 provides for economical spaced placement of the reservoir 92 in the dispensing apparatus 10.

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As shown in Figure 5, the reservoir 92 comprises a main body portion 110 having an end wall 112 mounted thereto. The end wall 112 has an exit opening 114 which is connected to tubing 94. The body portion 110 also has a sealing gasket 116 and a sealing plate 118 adapted to be mounted against the opposite end of the reservoir 92. This provides an enclosed space 120 which is adapted to be charged with pressurized gas.

The pressurized gas is filled into the reservoir 92 by means of compressor 90. Compressor 90 comprises a motor 122 having a spindle 124 connected to a reciprocating piston 128. Piston 128 is connected to a cam member 130 by a head bolt 132 passing through a circular opening 134 in the reciprocating piston 128. The end of piston 128 at 130 is adapted to force air out through opening 140 in the face plate 118 and into the reservoir 92 during an out-take stroke. The opening 118 is sealed by a one way valve 140. Also provided in the face plate 118 and the sealing member 116 is another opening 150 and 152 respectively. Openings 150 and 152 also are provided with a one way valve 154 and operate to draw air in through the reciprocating piston 128 on an intake stroke. The intake air is provided along the groove 170 provided in the reservoir 92.

During operation, the compressor 90 is activated by energizing motor 90 through a suitable electrical energy supply. The compressor creates a pressure charge within the reservoir 92 which is held in the reservoir 92 by pressure switch 96. The compressor 90 is controlled to generate this charge in the reservoir 92 until a predetermined charge is sensed in the reservoir 92 or a predetermined time period of compressor operation has expired. At this time, the compressor stops operating.

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During a dispense cycle, the tap 14 in the apparatus 10 is activated which causes the beer 52, maintained under pressure in the keg 22, to move through open end 64 of tube 66 and out through valve 60 to the tap 14 and into the glass container 18. When the tap 14 is activated, pressure switch 96 opens to allow at least a portion of the charge of pressure to pass from reservoir 92 along tube 94 and in through air valve 98 into the space 62 between the bag 55 and keg walls 22. This creates additional pressure within head space 62 which is forced against the bag to further deflate the bag and maintain an adequate dispensing flow of the beer through the tap 14 into the glass 18 so as to prevent the beer from frothing and to reduce dampening pressure fluctuations. This is particularly the case when the head space 62 is relatively small and there is need for quick build up of pressure as represented by arrow 63 in order to effect proper dispensing of the beer.

During the dispensing operation, the compressor 90 is activated to maintain a consistent pressure to the air reservoir which is passed through the tubing 94 in the event that multiple pours of beverage are being dispensed into glass 18. After the tap 14 is turned off, the compressor 90 continues to charge the reservoir 92 until either a predetermined pressure is obtained or for a predetermined time period so that a sufficient or adequate pressure charge is once again stored in the reservoir 92.

WHAT IS CLAIMED IS:

1. An alcohol beverage dispensing apparatus comprising:  
a keg having a self-contained bag filled with an alcohol beverage;  
a pressure system adapted to maintain a gas pressure in the keg against the bag to assist in the dispensing of the beverage from the dispensing apparatus, the pressure system comprising:  
a keg gas valve mounted to the keg to permit entry of pressurized gas into the keg;  
a pressure reservoir mounted in the apparatus, outside the keg and in fluid flow communication with the keg gas valve, the pressure reservoir storing a charge of pressurized gas and being adapted to supply at least a portion of the charge of pressurized gas into the keg through the keg gas valve when the dispensing apparatus is operated to dispense the beverage.
2. The alcohol beverage dispensing apparatus of claim 1 wherein the pressure system further comprises a gas compressor connected with the pressure reservoir for charging the reservoir with pressurized gas prior to the dispensing apparatus being operated to dispense the beverage.
3. The apparatus of claim 1 wherein the gas is air.
4. The apparatus of claim 1 wherein the keg has a curved side wall and the pressurized reservoir has a curved wall adapted to surround in adjacent relation a portion of the curved side wall of the keg.
5. The apparatus of claim 1 wherein the pressure system further comprises a pressure switch connected in fluid communication between the pressure reservoir and the keg gas valve, and the pressure switch enabling pressurized gas to flow from the reservoir into the keg through

the keg gas valve when beverage is dispensed from the bag.

6. The apparatus of claim 2 wherein the compressor continues to charge the reservoir during dispensing of the beverage from the dispensing apparatus until air pressure in the pressure reservoir reaches a predetermined pressure level.

7. The apparatus of claim 2 wherein the compressor comprises a reciprocal pump adapted to draw gas into the pump on an intake stroke and adapted to force gas out of the pump during an out-take stroke.

8. The apparatus of claim 7 wherein the pump has a first one-way pump valve connected to the pump to permit gas to enter the pump and a second one-way pump valve connected to the pump to permit gas to exit the pump and remain in the pressure reservoir.

9. A home beer dispensing apparatus comprising:

a keg having a self-contained bag filled with a beer;

a pressure system adapted to create a pressurized air space between the keg inner walls and the bag to assist in the dispensing of the beer from the dispensing apparatus, the pressure system comprising:

a keg one-way air valve mounted to a top wall of the keg to permit entry of pressurized air into the keg;

a pressure reservoir mounted in the apparatus outside the keg and in fluid flow communication with the keg one-way valve, the pressure reservoir storing a charge of pressurized air and being adapted to supply at least a portion of the charge of pressurized air to the keg through the keg air valve when the dispensing apparatus is operated to dispense the beverage; and,

an air compressor connected with the pressurized reservoir for charging the reservoir with pressurized air.

10. The apparatus of claim 9 wherein the keg has a curved side wall and the pressurized reservoir has a curved wall adapted to surround in adjacent relation a portion of a curved side wall of the keg.

11. The apparatus of claim 9 wherein the pressure system further comprises a pressure switch connected in fluid communication between the pressure reservoir and the keg air valve, and the pressure switch enabling pressurized air to flow from the reservoir into the keg through the keg air valve when beverage is dispensed from the bag.

12. The apparatus of claim 11 wherein the compressor continues to charge the reservoir during dispensing of the beer from the dispensing apparatus until air pressure in the pressure reservoir reaches a predetermined pressure level.

13. The apparatus of claim 9 wherein the compressor comprises a reciprocal pump adapted to draw air into the pump on an intake stroke and adapted to force air out of the pump and into the reservoir during an out-take stroke.

14. The apparatus of claim 13 wherein the pump has a first one-way pump valve connected to the pump to permit gas to enter the pump and a second one-way pump valve connected to the pump to permit gas to exit the pump and enter the pressure reservoir.



## BEER DISPENSING SYSTEM WITH GAS PRESSURE RESERVOIR

### ABSTRACT

A home beer dispensing apparatus has a keg having a self-contained bag filled with a beer and a pressure system. The pressure system creates a pressurized air space between the keg inner walls and the bag to assist in the dispensing of the beer. The pressure system has a keg one-way air valve mounted to a top wall of the keg to permit entry of pressurized air into the keg. The pressure system has a pressure reservoir mounted in the dispensing apparatus outside the keg and in fluid flow communication with the keg one-way valve. The reservoir stores a charge of pressurized air and supplies at least a portion of this charge to the keg through the keg air valve when the dispensing apparatus is operated to dispense the beer. The reservoir provides a reserved charge of pressurized gas that is on hand to reduce dampening pressure fluctuations during beer dispensing which can result in beer frothing, especially during the early stages of beer dispensing when the air head space in the keg is small.

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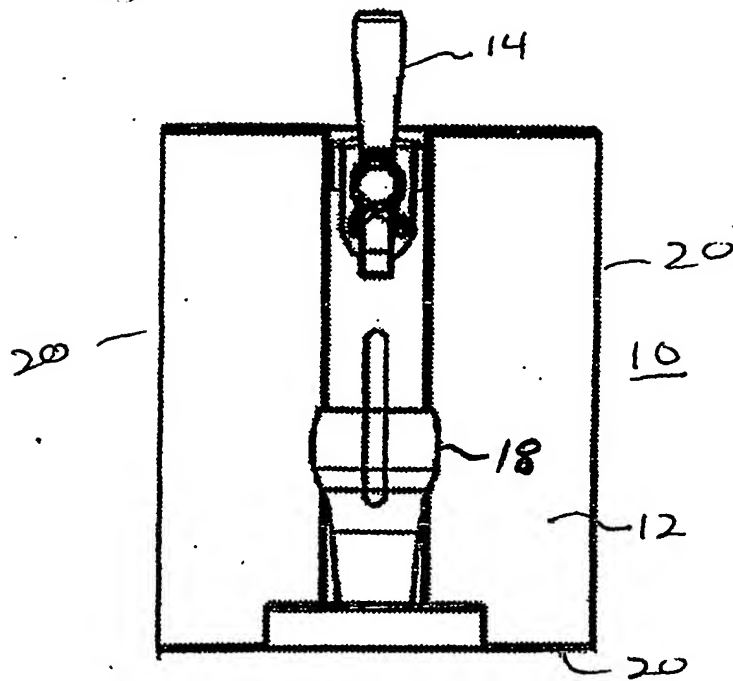


FIG. 1

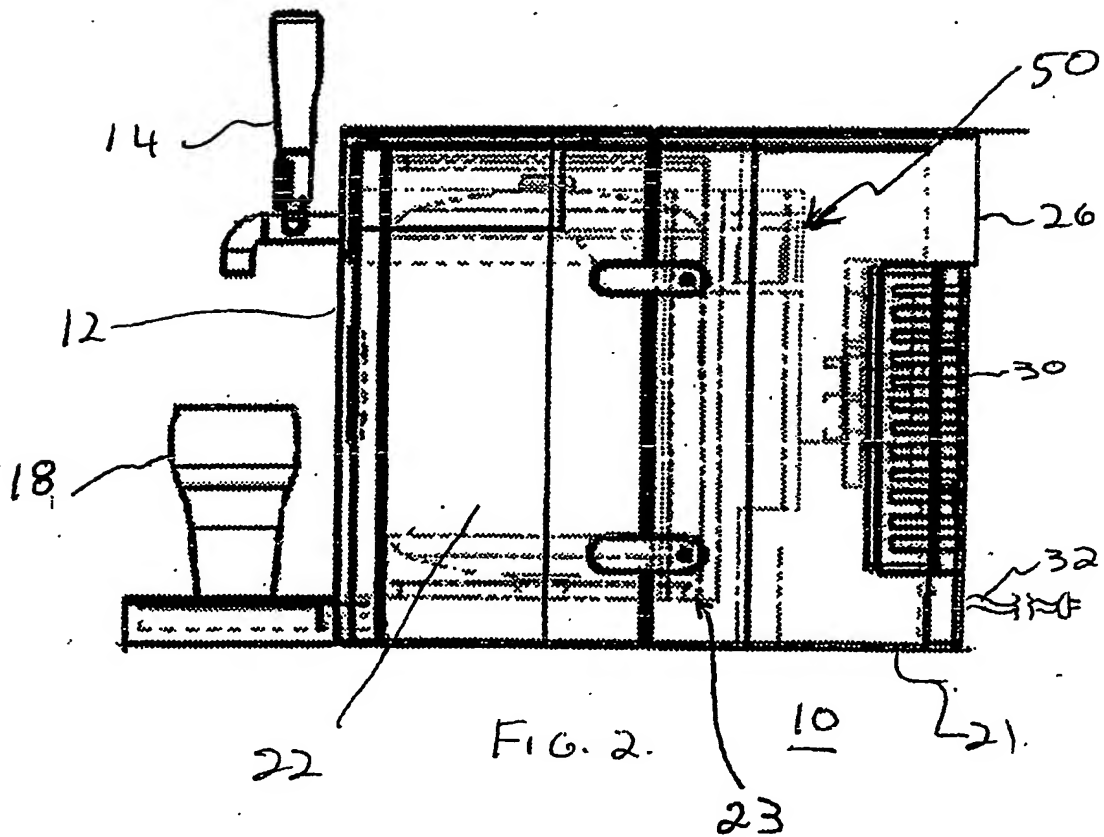
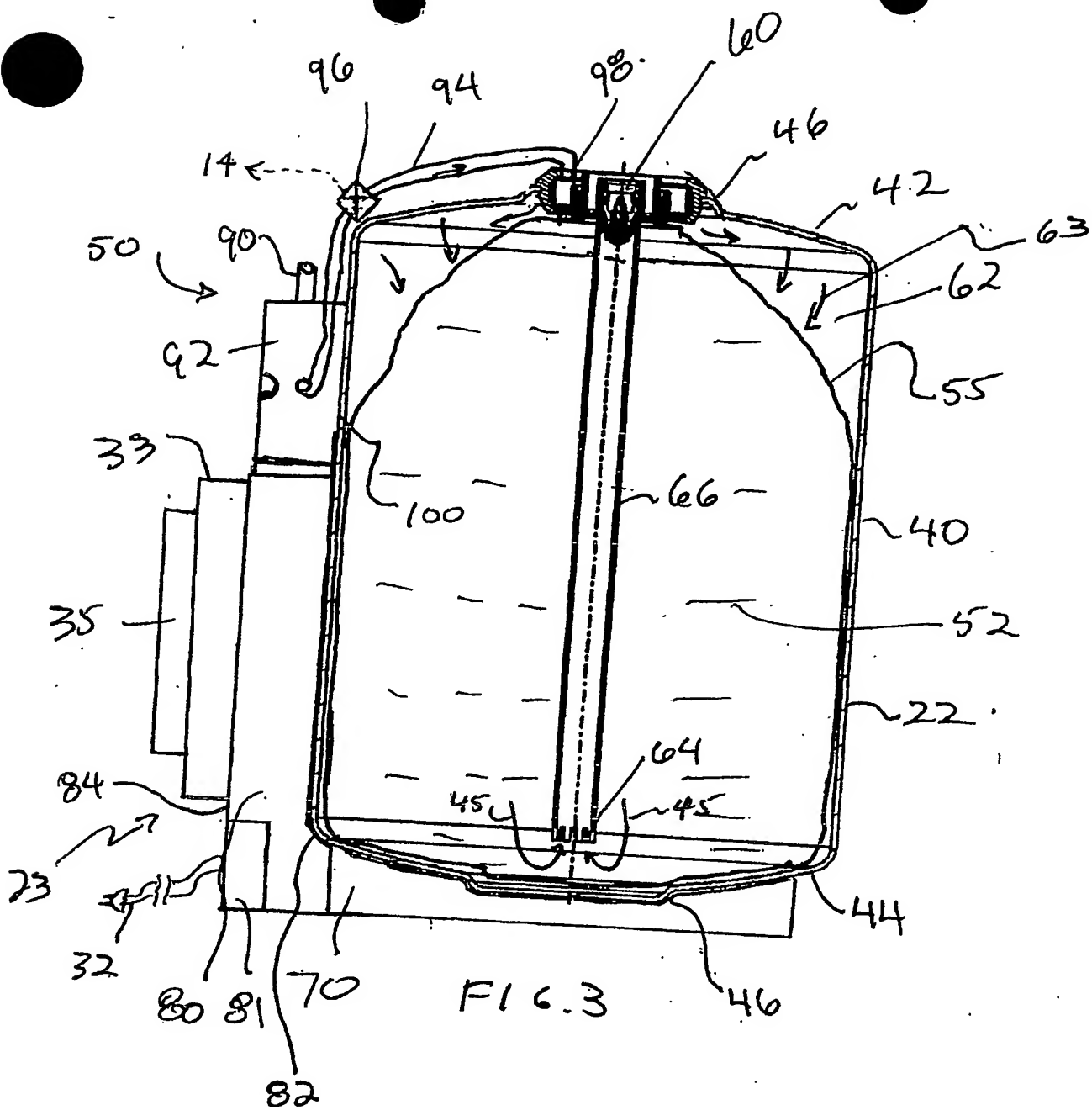
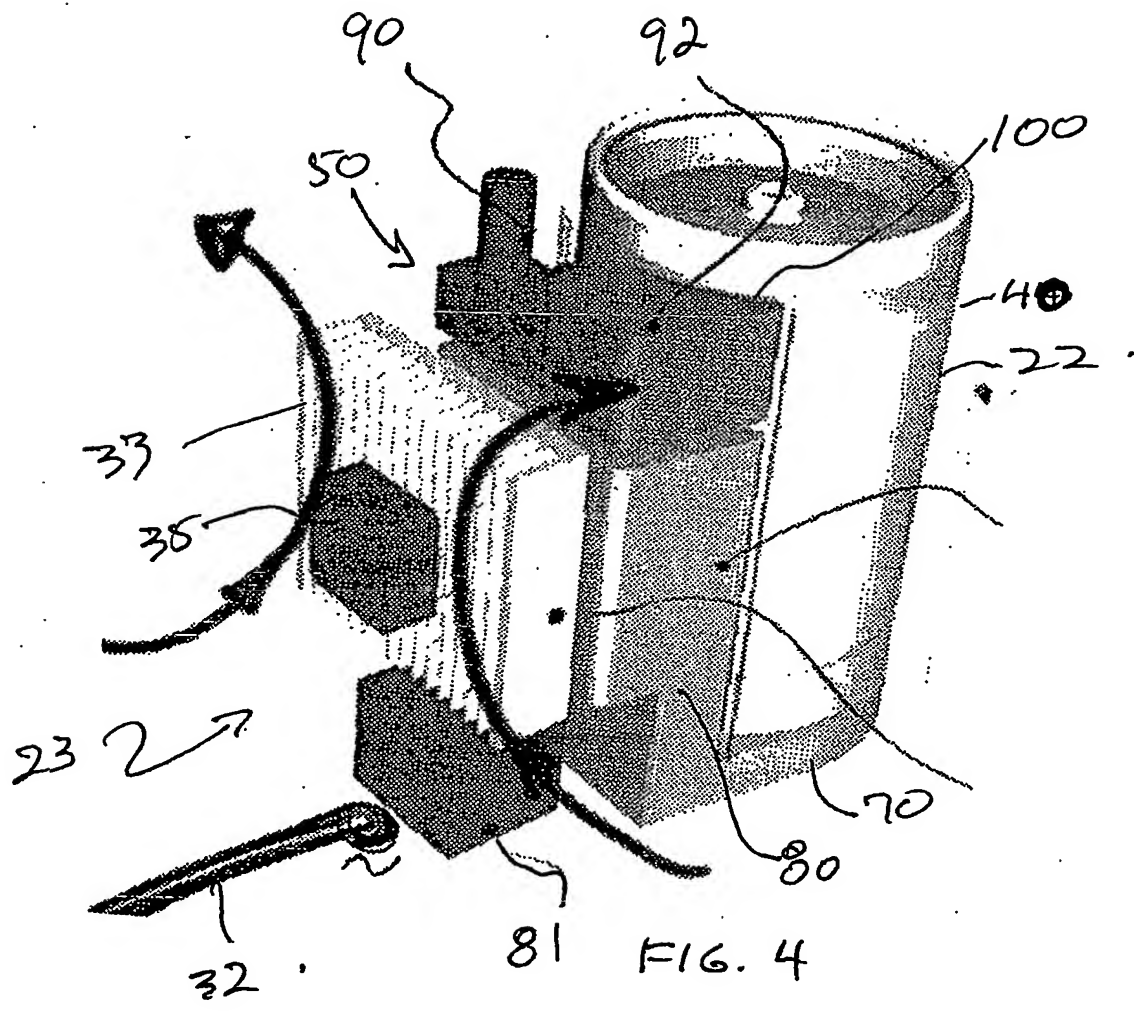
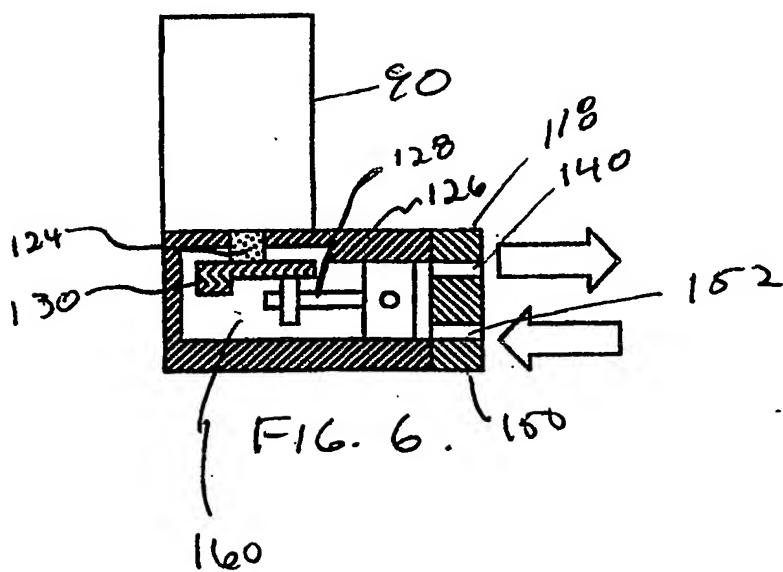
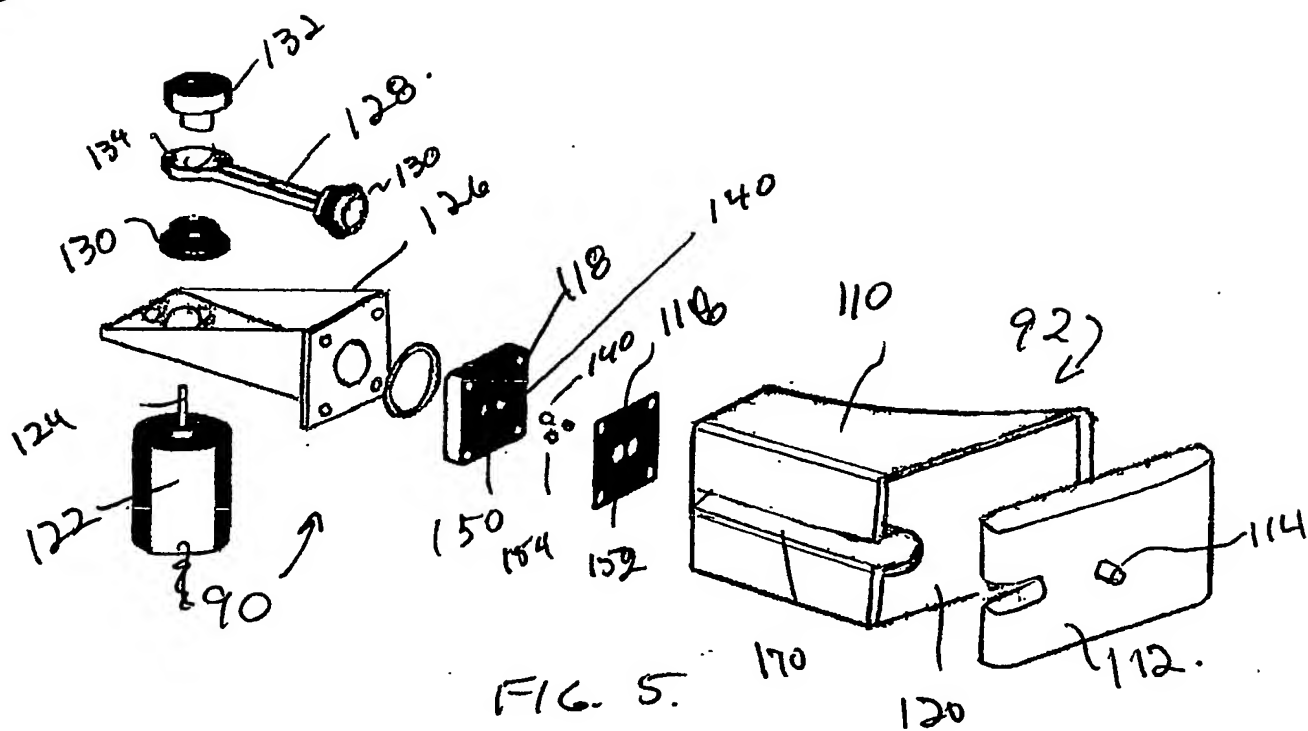


FIG. 2

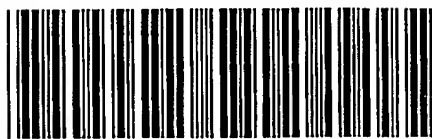






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